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Chapter 9 Data Quality Review

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Overview

This data quality review covers the reporting period from August 1, 1998, through September 30, 2001. The Municipal Water Quality Investigations (MWQI) Program monitored and collected data from 14 stations during this reporting period.

The data review was performed using the available quality control (QC) data stored in the California Department of Water Resources' (DWR) Field and Laboratory Information Management System (FLIMS) database. The database was used to retrieve the data and flag the analyses that were outside established control limits.

The data quality review indicated that overall the 1998–2001 MWQI project data were of acceptable quality. A few analyses were outside the control limits, but they were not considered to have a significant impact on the overall data quality of the project. The results of the review are presented below.

Field Procedures Quality Control

Field Duplicates

Field duplicates are replicate samples taken at a randomly selected station during each field run to evaluate precision of field and laboratory procedures. The results of field duplicate analyses are evaluated by calculating relative percent differences (RPDs) and comparing the RPDs with established control limits. The equation for expressing precision is:

$$RPD = (D_1 - D_2) / [(D_1 + D_2) / 2] \times 100,$$

where D₁ is the first sample value and D₂ is the second sample value. During the study period, 2,698 field duplicate analyses were performed and 55 (2%) of the RPDs exceeded the acceptable control limits (Table 9-1). The results indicate that field and laboratory procedures were of acceptable precision for the project.

Table 9-1 Field duplicates

Field Blanks

Field blanks are purified water samples taken to the field and filtered or left unfiltered. Filtered blanks help check for contamination from field sample processing procedures. Unfiltered blanks check for contamination from containers and preservatives. In the study period, 107 field blank analyses were performed, and none of them exceeded the control limit.

Internal Quality Controls

Internal QCs are procedures used in the laboratory to ensure that the analytical methods are in control. Environmental samples are grouped in “batches,” with approximately 20 samples per batch. Generally, one of each QC measure such as method blank, matrix spike, etc. is performed with each batch to confirm that the analytical method is in control. In some cases the laboratory performs more than one of each of the QC measures to ensure the quality of the batch. The total number of internal QC analyses performed per analyte is shown in Table 9-2. The following is a review of the internal QC for the project.

Sample Holding Times

Holding time is the period during which a sample can be stored after collection and preservation without significantly affecting the accuracy of its analysis. During the 1998-2001 study period, approximately 14,183 environmental analyses were conducted and 26 analyses (0.18 %) exceeded the holding time. The analyses that exceeded the holding times are listed in Table 9-3. The analytes that exceeded holding times were alkalinity, nitrate, total organic carbon (TOC), total dissolved solids (TD), orthophosphate and turbidity. Turbidity, orthophosphate, and nitrate have a holding time limit of 48 hours, whereas alkalinity has a holding time limit of 14 days, TOC has a limit of 28 days, and TDS has a limit of 7 days. The table shows the number of hours or days that the samples were held by the laboratory compared to their holding time limits. The analytes in the table exceeded holding time limits from a couple of hours to several days. Although the frequency of these exceedances was low, the results of the specific analyses should be interpreted with caution.

Method Blanks

The purpose of method blanks is to detect and quantify contamination introduced through sample preparation or analytical procedures in the laboratory (some “background noise” is allowed). A total of 3,821 method blanks were performed from August 1998 through September 2001, and 19 (0.5%) exceeded the control limits.

Table 9-4 shows the number of method blanks outside the control limits. The analytes were alkalinity and TDS. Table 9-5 shows the frequency of method blank contamination for these analytes. The frequency of method blanks out of the control limits was 6.7% for alkalinity and 2.1% for TDS. The samples affected by method blank contamination are shown in Table 9-6.

Laboratory Control Samples

Laboratory control sample (LCS) recoveries are used to assess the accuracy of the analytical method especially when matrix interference occurs in the analyses of the environmental samples. LCSs are prepared by adding a known concentration of analyte of interest into a clean medium. The LCS is then analyzed, and the results are compared to the laboratory’s control limits. During the period of August 1998 through September 2001, 5,654 LCS analyses were performed (Table 9-2) and none of the results exceeded the

Table 9-2 Total internal QC batches grouped by analyte

Table 9-3 Holding time exceedances

Table 9-4 Method blank exceedances

Table 9-5 Number of batches with method blank exceedances

Table 9-6 Environmental samples associated with method blank exceedances

control limits. Therefore, the laboratory analyses for the project were of acceptable accuracy.

Matrix Spike Recovery

Matrix spike recoveries indicate the accuracy of recovering a known concentration of substance in a matrix of interest. The results of matrix spike recoveries indicate the accuracy of analysis given the interference peculiar to a given matrix. Matrix spikes are prepared by adding a known concentration of method analytes to an environmental sample with known background concentration. The percent recovery must fall within acceptable limits. During the study period, 7,554 matrix spike recoveries were performed, and only 81 (1.1%) exceeded the control limits. The batches with matrix spike recoveries outside the control limits are shown in Table 9-7. The analytes that had matrix spike exceedances were alkalinity, ammonia, boron, bromide, bromoform, chloride, calcium, magnesium, nitrate, sulfate, silver, sodium and trichloacetic acid (TCAA). Alkalinity had a frequency of exceedance of 2.2% (Table 9-8). Some of the recoveries were high, but the RPDs and LCS for those batches were within limits; therefore, the batch is considered in control. Recoveries that were lower than the control limits can be attributed to matrix interference, but the LCS for those batches were in control.

The analytes with the highest frequency of exceedances were TCAA, silver and sodium (Table 9-8). TCAA and sodium were out of recovery limits for both matrix spikes and spike duplicate, which suggests matrix interference. The LCS and RPDs were within limits for all of these analytes; therefore, the batch was considered in control.

The low frequency of recoveries outside the control limits for the remaining analytes was considered insignificant to the overall data quality of the project. Therefore, the laboratory analyses were of acceptable accuracy, and matrix interference did not have significant effects on the analyses. The environmental samples in these batches are shown in Table 9-9.

Matrix Spike Duplicates

Matrix spike duplicate results indicate the precision of the analytical method in a given matrix. The difference between the duplicate samples is reported as an RPD. This difference is compared against the laboratory's control limits as a conservative approach to determining precision. During the study period, 3,537 matrix spike duplicates were performed. Only 3 matrix spike duplicate batches exceeded the control limits (0.08%), shown in Table 9-10. The analytes were bromide and sodium, and the frequency of exceedance is shown in Table 9-11. The frequency of samples outside the control limits for both analytes was very low. The environmental samples are shown in Table 9-12. This indicates that matrix interference had no significant effects in the precision of the laboratory analysis of the environmental samples.

Sample Duplicates

Sample duplicates are environmental samples that are divided into 2 aliquots in the laboratory and analyzed independently to determine the repeatability of the analytical method. The RPD for the duplicate results must fall within the established control limits. During the study period, there were 2,284

Table 9-7 Matrix spike recovery exceedances

Table 9-8 Frequency of QC batches with matrix spike recovery exceedances

Table 9-9 Samples with matrix spike recovery exceedances

Table 9-10 Matrix spike duplicate exceedances

Table 9-11 Number of matrix spike duplicate recovery exceedances

Table 9-12 Samples with matrix spike duplicate exceedances

RPD sample duplicate analyses performed, and the RPDs for 10 sample duplicates (0.43%) exceeded the control limits. The sample duplicate batches outside of the control limits are shown in Table 9-13.

A total of 498 sample duplicate analyses were performed for DOC, and only 5 (1%) were outside the control limits. Out of 92 TOC sample duplicate analyses performed with the combustion method, only one (1%) was outside the control limits. There were 383 TOC sample duplicate analyses performed with the oxidation method, and only 2 (0.5%) were out of the control limits. Turbidity and TDS had very low frequencies of duplicates outside of the control limits and, therefore, did not have a significant impact on the overall data quality of the project (Table 9-14). These results indicate the laboratory had acceptable precision in its analysis of the project samples. The environmental samples are shown in Table 9-15.

Table 9-13 Sample duplicate exceedances

Table 9-14 Number of sample duplicate exceedances

Table 9-15 Samples with sample duplicate exceedances

Table 9-1 Field duplicates

Analyte	Collection date	Sample number	Sample duplicate	Result 1	Result 2	RPD %	RPD limit %
Bromodichloromethane	8/11/1998	CB0898A2549	CB0898A2550	29	65	77	20
Dibromoacetic Acid (DBAA)	8/4/1998	CB0898A2658	CB0898A2659	1	4	120	30
Dibromochloromethane	8/11/1998	CB0898A2549	CB0898A2550	23	29	23	20
Dissolved boron	5/15/2000	CD0500B1367	CD0500B1368	0.2	0.1	67	25
Dissolved boron	2/22/1999	CB0299A0916	CB0299A0918	0.0341	0.00	200	25
Dissolved boron	3/3/1999	CB0399A1205	CB0399A1207	0.075	0.00	200	25
Dissolved boron	3/15/1999	CB0399A1238	CB0399A1239	0	0.178	200	25
Dissolved boron	12/14/1999	CB1299A3304	CB1299A3307	0.1304	0.1	26	25
Dissolved bromide	8/4/1998	CB0898A2524	CB0898A2527	0.016	0.01	46	20
Dissolved bromide	1/11/1999	CB0199A0022	CB0199A0024	0.02	0.01	67	20
Dissolved bromide	4/26/1999	CB0499A1617	CB0499A1618	0.09	0.13	36	20
Dissolved bromide	11/8/1999	CB1199A2915	CB1199A2916	0.39	0.26	40	20
Dissolved bromide	12/6/1999	CB1299A3295	CB1299A3296	0.02	0.01	67	20
Dissolved bromide	12/7/1999	CB1299A3311	CB1299A3313	0.6	12.02	181	20
Dissolved chloride	2/22/2000	CB0200B1029	CB0200B1031	3	4	29	20
Dissolved chloride	2/2/1999	CB0299A0869	CB0299A0870	3	4	29	20
Dissolved chloride	2/22/1999	CB0299A0916	CB0299A0918	3	2	40	20
Dissolved chloride	5/4/1999	CB0599A1847	CB0599A1850	1	2	67	20
Dissolved magnesium	1/31/2000	CB0100B0348	CB0100B0350	5.24	7	29	25
Dissolved magnesium	7/7/1999	CB0799A2237	CB0799A2240	2	1	67	25
Dissolved magnesium	8/4/1999	CB0899A2434	CB0899A2437	1.51	2	28	25
Dissolved nitrate	8/4/1998	CB0898A2524	CB0898A2527	0.4	0.3	29	20
Dissolved nitrate	4/7/1999	CB0499A1512	CB0499A1515	0.1	0.2	67	20
Dissolved nitrate	5/17/1999	CB0599A1901	CB0599A1903	0.4	0.3	29	20
Dissolved nitrate	11/2/1999	CB1199A2889	CB1199A2890	0.5	0.4	22	20
Dissolved nitrate	12/14/1999	CB1299A3304	CB1299A3307	2.4	1.8	29	20
Dissolved sulfate	2/28/2000	CB0200B1076	CB0200B1078	3	2	40	20
Dissolved sulfate	3/13/2000	CD0300B0797	CD0300B0799	4	3	29	20
Dissolved sulfate	4/5/2000	CD0400B1289	CD0400B1292	22	15	38	20
Dissolved sulfate	9/22/1998	CA0998A0303	CA0998A0305	4	5	22	20
Dissolved sulfate	8/4/1998	CB0898A2524	CB0898A2527	4	6	40	20
Dissolved sulfate	8/4/1998	CB0898A2658	CB0898A2659	21	12	55	20
Dissolved sulfate	1/25/1999	CB0199A0053	CB0199A0055	4	5	22	20
Dissolved sulfate	2/2/1999	CB0299A0869	CB0299A0870	4	3	29	20
Dissolved sulfate	4/7/1999	CB0499A1512	CB0499A1515	2	1	67	20
Dissolved sulfate	12/20/1999	CB1299A3334	CB1299A3336	7	5	33	20
Hardness	1/31/2000	CB0100B0348	CB0100B0350	48	59	21	20
Hardness	7/7/1999	CB0799A2237	CB0799A2240	18	14	25	20

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Table 9-1 continued

Analyte	Collection date	Sample number	Sample duplicate	Result 1	Result 2	RPD %	RPD limit %
TDS	1/10/2000	CB0100B0319	CB0100B0321	86	119	32	15
TDS	1/5/1999	CB0199A0010	CB0199A0014	271	316	15	15
TDS	3/8/1999	CB0399A1217	CB0399A1219	66	81	20	15
TDS	12/13/1999	CB1299A3326	CB1299A3327	594	487	20	15
TOC	10/6/1999	CB1099A2812	CB1099A2815	1.6	1.1	37	30
Turbidity	1/3/2000	CB0100B0280	CB0100B0283	1.5	1.9	24	15
Turbidity	1/5/2000	CB0100B0299	CB0100B0300	11.3	9.6	16	15
Turbidity	6/19/2000	CD0600B1438	CD0600B1439	31.2	26.3	17	15
Turbidity	11/4/1998	CB1198A3852	CB1198A3856	19.5	16.7	15	15
Turbidity	9/8/1998	CA0998A0297	CA0998A0299	9	10.6	16	15
Turbidity	1/6/1999	CB0199A0017	CB0199A0019	16.8	20.2	18	15
Turbidity	8/23/1999	CB0899A2480	CB0899A2481	38.2	28	31	15
Turbidity	10/5/1999	CB1099A2826	CB1099A2830	33	28	16	15
Turbidity	10/7/1999	CB1099A2821	CB1099A2823	29.3	21.6	30	15
Turbidity	10/25/1999	CB1099A2809	CB1099A2810	19	22.3	16	15
Turbidity	12/13/1999	CB1299A3326	CB1299A3327	9.9	12.5	23	15
UV absorbance @254 nm	3/2/1999	CB0399A1210	CB0399A1211	0.126	0.16	24	10

TDS = Total dissolved solids

TOC = Total organic carbon

Table 9-2 Total internal QC batches grouped by analyte

Analyte	Method	LCS recovery	RPD–LCS duplicate	Matrix Spike	RPD–Matrix Spike Duplicate	Method Blank	RPD sample duplicate	Surrogate recovery
Minor elements								
Aluminum	EPA 200.8 (D)	86	43	172	86	43		
Arsenic	EPA 200.8 (D)	86	43	172	86	43		
Barium	EPA 200.8 (D)	76	38	160	80	38		
Boron	EPA 200.7 (D)	354	175	550	271	221		
Cadmium	EPA 200.8 (D)	76	38	156	78	38		
Chromium	EPA 200.8 (D)	78	39	158	79	39		
Copper	EPA 200.8 (D)	86	43	176	88	43		
Iron	EPA 200.8 (D)	86	43	178	89	43		
Lead	EPA 200.8 (D)	78	39	162	81	39		
Manganese	EPA 200.8 (D)	86	43	178	89	43		
Nickel	EPA 200.8 (D)	60	30	98	49	30		
Selenium	EPA 200.8 (D)	62	31	76	38	31		
Silver	EPA 200.8 (D)	76	38	156	78	38		
Zinc	EPA 200.8 (D)	78	39	158	79	39		
Bromide								
Bromide	EPA 300.0 28d Hold	253	174	631	280	165	11	
THMFP								
Bromodichloromethane	DWR THMFP (Buffered)			32	12	13		22
Bromoform	DWR THMFP (Buffered)			32	12	13		22
Chloroform	DWR THMFP (Buffered)			32	12	13		22
Dibromochloromethane	DWR THMFP (Buffered)			32	12	13		22
Bromochloroacetic acid (BCAA)	DWR HAAFP (Reactivity)	12	6	16	6	6		19
Dibromoacetic acid (DBAA)	DWR HAAFP (Reactivity)	12	6	16	6	6		19
Dichloroacetic acid (DCAA)	DWR HAAFP (Reactivity)	12	6	16	6	6		19
Monobromoacetic acid (MBAA)	DWR HAAFP (Reactivity)	12	6	16	6	6		19
Monochloroacetic acid (MCAA)	DWR HAAFP (Reactivity)	12	6	16	6	6		19
Trichloroacetic acid (TCAA)	DWR HAAFP (Reactivity)	12	6	16	6	6		19

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Table 9–2 continued

Analyte	Method	LCS recovery	RPD-LCS duplicate	Matrix Spike	RPD-Matrix Spike Duplicate	Method Blank	RPD sample duplicate	Surrogate recovery
Organic carbon								
DOC	EPA 415.1 (D) Ox	408	197			203	498	
TOC	EPA 415.1 (T) Ox	358	177			178	383	
TOC	EPA 415.1 (T) Cmbst	90	45			45	92	
UV absorbance @254nm	Std Method 5910 B	226	112			135	223	
EC and salts								
Conductance (EC)	Std Method 2510 B					105	298	
Calcium	EPA 200.7 (D)	354	175	618	278	222	1	
Magnesium	EPA 200.7 (D)	354	175	618	278	222	1	
Chloride	EPA 325.2	210	105	394	178	109	3	
Sodium	EPA 200.7 (D)	354	175	562	276	222		
Sulfate	EPA 375.2	206	103	380	173	108	1	
Nutrients								
Nitrate	EPA 300.0 28d Hold	60	29	62	26	30		
Nitrate	Std Method 4500-NO ₃ F	334	167	356	155	328		
Ammonia	EPA 350.1	64	32	88	44			
Kjeldahl nitrogen	EPA 351.2	50	25	42	21	29		
Orthophosphate	Std Method 4500-P, F	58	29	74	37	29		
Phosphorus	EPA 365.4	50	25	44	22	29		

DOC = dissolved organic carbon

TOC = total organic carbon

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Table 9-2 continued

Analyte	Method	LCS recovery	RPD-LCS duplicate	Matrix x Spike	RPD-Matrix Spike Duplicate	Method Blank	RPD sample duplicate	Surrogate recovery
Miscellaneous								
pH	pH - Std Method 2320 B						6	
pH	Std Method 5910 B						15	
Hardness	Std Method 2340 B							
Alkalinity	Std Method 2320 B	335	164	603	270	224	38	
Methyl tert-butyl ether (MTBE)	EPA 502.2	2		308	144	131		149
Turbidity								
Turbidity	EPA 180.1	448	220			274	311	
Turbidity	Std Method 2130 B							
TSS	EPA 160.2					30	104	
TDS	Std Method 2540 C					187	299	
Total		5,654	2,847	7,554	3,537	3,821	2,284	513

TSS = Total suspended solids

TDS = Total dissolved solids

Table 9-3 Holding time exceedances

Analyte	Collection date	Sample number	Holding time	Limit
Alkalinity	9/27/1999	CB0999A2608	15 days	14
Alkalinity	8/7/2000	CD0800B1604	32 days	14
Alkalinity	9/27/1999	CB0999A2606	15 days	14
Alkalinity	9/27/1999	CB0999A2607	15 days	14
Alkalinity	8/7/2000	CD0800B1603	32 days	14
Nitrate	11/7/2000	CB1100B1571	143 hours	48
Nitrate	11/7/2000	CB1100B1572	142 hours	48
Nitrate	11/7/2000	CB1100B1569	145 hours	48
Organic Carbon (Total) by Combustion	12/5/2000	CB1200B0054	44 days	28
Organic Carbon (Total) by Combustion	12/11/2000	CB1200B0066	31 days	28
Organic Carbon (Total) by Combustion	12/5/2000	CB1200B0055	44 days	28
Organic Carbon (Total) by Combustion	12/11/2000	CB1200B0065	31 days	28
TDS	8/21/2000	CD0800B1620	8 days	7
TDS	8/21/2000	CD0800B1619	8 days	7
Turbidity	1/8/2001	CB0101B1666	69 hours	48
Turbidity	1/8/2001	CB0101B1665	70 hours	48
Turbidity	1/9/2001	CB0101B1671	189 hours	48
Turbidity	6/21/1999	CB0699A2086	53 hours	48
Turbidity	6/21/1999	CB0699A2088	53 hours	48
Turbidity	11/20/2000	CB1100B1605	168 hours	48
Turbidity	1/8/2001	CB0101B1667	68 hours	48
Turbidity	1/8/2001	CB0101B1664	72 hours	48
Turbidity	1/9/2001	CB0101B1669	191 hours	48
Turbidity	6/21/1999	CB0699A2087	54 hours	48
Turbidity	11/20/2000	CB1100B1604	170 hours	48
Orthophosphate	11/7/2000	CB1100B1572	142 hours	48

TDS = Total dissolved solids

Table 9-4 Method blank exceedances

Analyte	Method	Batch number	Result	Reporting Limit	Units
Alkalinity	Std Method 2320 B	BL00B6128	1.8	1	mg/L as C
Alkalinity	Std Method 2320 B	BL00B6181	1.6	1	mg/L as C
Alkalinity	Std Method 2320 B	BL00B6206	1.6	1	mg/L as C
Alkalinity	Std Method 2320 B	BL00B6247	1.9	1	mg/L as C
Alkalinity	Std Method 2320 B	BL00B6291	1.3	1	mg/L as C
Alkalinity	Std Method 2320 B	BL00B6310	1.5	1	mg/L as C
Alkalinity	Std Method 2320 B	BL00B6344	1.5	1	mg/L as C
Alkalinity	Std Method 2320 B	BL00B6376	1.5	1	mg/L as C
Alkalinity	Std Method 2320 B	BL00B6433	1.5	1	mg/L as C
Alkalinity	Std Method 2320 B	BL00B6449	1.2	1	mg/L as C
Alkalinity	Std Method 2320 B	BL00B6487	1.4	1	mg/L as C
Alkalinity	Std Method 2320 B	BL00B6557	1.3	1	mg/L as C
Alkalinity	Std Method 2320 B	BL00B6640	1.6	1	mg/L as C
Alkalinity	Std Method 2320 B	BL00B5899	1.1	1	mg/L as C
Alkalinity	Std Method 2320 B	BL00B5904	1.1	1	mg/L as C
TDS	Std Method 2540 C	BL00B5900	9	1	mg/L
TDS	Std Method 2540 C	BL00B5905	2	1	mg/L
TDS	Std Method 2540 C	BL00B6022	4	1	mg/L
TDS	Std Method 2540 C	BL00B6292	6	1	mg/L

TDS = Total dissolved solids

Table 9-5 Number of batches with method blank exceedances

Analyte	Total batches	Batches with method blanks out of limits	Frequency of samples out of limits (%)
Alkalinity	224	15	6.7
TDS	187	4	2.1

TDS = Total dissolved solids

Table 9-6 Environmental samples associated with method blank exceedances

Analyte	Method	Batch number	Sample number	Collection date
Alkalinity	Std Method 2320 B	BL00B6128	SLA0500B0101	5/17/2000
Alkalinity	Std Method 2320 B	BL00B6128	DA0500B0255	5/17/2000
Alkalinity	Std Method 2320 B	BL00B6128	DA0500B0249	5/17/2000
Alkalinity	Std Method 2320 B	BL00B6128	CD0500B1383	5/22/2000
Alkalinity	Std Method 2320 B	BL00B6128	CD0500B1384	5/22/2000
Alkalinity	Std Method 2320 B	BL00B6128	CD0500B1385	5/22/2000
Alkalinity	Std Method 2320 B	BL00B6128	CD0500B1383	5/22/2000
Alkalinity	Std Method 2320 B	BL00B6181	CD0500B1391	5/30/2000
Alkalinity	Std Method 2320 B	BL00B6181	CD0500B1392	5/30/2000
Alkalinity	Std Method 2320 B	BL00B6181	CD0500B1393	5/30/2000
Alkalinity	Std Method 2320 B	BL00B6181	CD0500B1392	5/30/2000
Alkalinity	Std Method 2320 B	BL00B6181	CD0500B1392	5/30/2000
Alkalinity	Std Method 2320 B	BL00B6206	CD0600B1404	6/5/2000
Alkalinity	Std Method 2320 B	BL00B6206	CD0600B1405	6/5/2000
Alkalinity	Std Method 2320 B	BL00B6206	CD0600B1406	6/5/2000
Alkalinity	Std Method 2320 B	BL00B6206	CD0600B1407	6/5/2000
Alkalinity	Std Method 2320 B	BL00B6206	CD0600B1408	6/5/2000
Alkalinity	Std Method 2320 B	BL00B6206	CD0600B1413	6/6/2000
Alkalinity	Std Method 2320 B	BL00B6206	CD0600B1414	6/6/2000
Alkalinity	Std Method 2320 B	BL00B6206	CD0600B1415	6/6/2000
Alkalinity	Std Method 2320 B	BL00B6206	CD0600B1416	6/6/2000
Alkalinity	Std Method 2320 B	BL00B6206	CD0600B1417	6/7/2000
Alkalinity	Std Method 2320 B	BL00B6206	CD0600B1418	6/7/2000
Alkalinity	Std Method 2320 B	BL00B6206	CD0600B1419	6/7/2000
Alkalinity	Std Method 2320 B	BL00B6206	CD0600B1420	6/7/2000
Alkalinity	Std Method 2320 B	BL00B6206	CD0600B1421	6/7/2000
Alkalinity	Std Method 2320 B	BL00B6206	CD0600B1422	6/7/2000
Alkalinity	Std Method 2320 B	BL00B6206	CD0600B1404	6/5/2000
Alkalinity	Std Method 2320 B	BL00B6247	CD0600B1430	6/12/2000
Alkalinity	Std Method 2320 B	BL00B6247	CD0600B1431	6/12/2000
Alkalinity	Std Method 2320 B	BL00B6247	CD0600B1432	6/12/2000
Alkalinity	Std Method 2320 B	BL00B6247	CD0600B1438	6/19/2000
Alkalinity	Std Method 2320 B	BL00B6247	CD0600B1439	6/19/2000
Alkalinity	Std Method 2320 B	BL00B6247	CD0600B1440	6/19/2000
Alkalinity	Std Method 2320 B	BL00B6247	CD0600B1438	6/19/2000
Alkalinity	Std Method 2320 B	BL00B6291	SLA0600B0117	6/21/2000
Alkalinity	Std Method 2320 B	BL00B6291	DZ0600B5852	6/21/2000
Alkalinity	Std Method 2320 B	BL00B6291	DZ0600B5853	6/21/2000
Alkalinity	Std Method 2320 B	BL00B6310	CD0600B1446	6/26/2000
Alkalinity	Std Method 2320 B	BL00B6310	CD0600B1447	6/26/2000
Alkalinity	Std Method 2320 B	BL00B6310	CD0600B1448	6/26/2000
Alkalinity	Std Method 2320 B	BL00B6344	CD0700B1462	7/3/2000
Alkalinity	Std Method 2320 B	BL00B6344	CD0700B1463	7/3/2000
Alkalinity	Std Method 2320 B	BL00B6344	CD0700B1464	7/3/2000
Alkalinity	Std Method 2320 B	BL00B6344	CD0700B1465	7/3/2000

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Table 9-6 continued

Analyte	Method	Batch number	Sample number	Collection date
Alkalinity	Std Method 2320 B	BL00B6344	CD0700B1466	7/3/2000
Alkalinity	Std Method 2320 B	BL00B6344	CD0700B1471	7/3/2000
Alkalinity	Std Method 2320 B	BL00B6344	CD0700B1472	7/3/2000
Alkalinity	Std Method 2320 B	BL00B6344	CD0700B1473	7/3/2000
Alkalinity	Std Method 2320 B	BL00B6344	CD0700B1474	7/3/2000
Alkalinity	Std Method 2320 B	BL00B6344	CD0700B1475	7/3/2000
Alkalinity	Std Method 2320 B	BL00B6344	CD0700B1518	7/5/2000
Alkalinity	Std Method 2320 B	BL00B6344	CD0700B1519	7/5/2000
Alkalinity	Std Method 2320 B	BL00B6344	CD0700B1521	7/5/2000
Alkalinity	Std Method 2320 B	BL00B6344	CD0700B1522	7/5/2000
Alkalinity	Std Method 2320 B	BL00B6376	CD0700B1472	7/3/2000
Alkalinity	Std Method 2320 B	BL00B6376	CD0700B1481	7/10/2000
Alkalinity	Std Method 2320 B	BL00B6376	CD0700B1482	7/10/2000
Alkalinity	Std Method 2320 B	BL00B6376	CD0700B1483	7/10/2000
Alkalinity	Std Method 2320 B	BL00B6376	CD0700B1482	7/10/2000
Alkalinity	Std Method 2320 B	BL00B6433	CD0700B1525	7/17/2000
Alkalinity	Std Method 2320 B	BL00B6433	CD0700B1526	7/17/2000
Alkalinity	Std Method 2320 B	BL00B6433	CD0700B1527	7/17/2000
Alkalinity	Std Method 2320 B	BL00B6433	SLA0700B0202	7/19/2000
Alkalinity	Std Method 2320 B	BL00B6433	DZ0700B6600	7/19/2000
Alkalinity	Std Method 2320 B	BL00B6449	DZ0700B6604	7/19/2000
Alkalinity	Std Method 2320 B	BL00B6449	CD0700B1507	7/24/2000
Alkalinity	Std Method 2320 B	BL00B6449	CD0700B1508	7/24/2000
Alkalinity	Std Method 2320 B	BL00B6449	CD0700B1509	7/24/2000
Alkalinity	Std Method 2320 B	BL00B6487	CD0800B1550	8/1/2000
Alkalinity	Std Method 2320 B	BL00B6487	CD0800B1551	8/1/2000
Alkalinity	Std Method 2320 B	BL00B6487	CD0800B1552	8/1/2000
Alkalinity	Std Method 2320 B	BL00B6487	CD0800B1553	8/1/2000
Alkalinity	Std Method 2320 B	BL00B6487	CD0800B1554	8/1/2000
Alkalinity	Std Method 2320 B	BL00B6487	CD0800B1584	8/1/2000
Alkalinity	Std Method 2320 B	BL00B6487	CD0800B1586	8/1/2000
Alkalinity	Std Method 2320 B	BL00B6487	CD0800B1583	8/1/2000
Alkalinity	Std Method 2320 B	BL00B6487	CD0800B1639	8/2/2000
Alkalinity	Std Method 2320 B	BL00B6487	CD0800B1642	8/2/2000
Alkalinity	Std Method 2320 B	BL00B6487	CD0800B1643	8/2/2000
Alkalinity	Std Method 2320 B	BL00B6487	CD0800B1585	8/2/2000
Alkalinity	Std Method 2320 B	BL00B6487	CD0800B1582	8/2/2000
Alkalinity	Std Method 2320 B	BL00B6487	CD0800B1586	8/1/2000
Alkalinity	Std Method 2320 B	BL00B6487	CD0800B1643	8/2/2000
Alkalinity	Std Method 2320 B	BL00B6557	CD0800B1602	8/7/2000
Alkalinity	Std Method 2320 B	BL00B6557	CD0800B1603	8/7/2000
Alkalinity	Std Method 2320 B	BL00B6557	CD0800B1604	8/7/2000
Alkalinity	Std Method 2320 B	BL00B6557	CD0800B1603	8/7/2000
Alkalinity	Std Method 2320 B	BL00B6640	CD0800B1610	8/14/2000
Alkalinity	Std Method 2320 B	BL00B6640	CD0800B1611	8/14/2000
Alkalinity	Std Method 2320 B	BL00B6640	CD0800B1612	8/14/2000

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Table 9-6 continued

Analyte	Method	Batch number	Sample number	Collection date
Alkalinity	Std Method 2320 B	BL00B6640	CD0800B1611	8/14/2000
Alkalinity	Std Method 2320 B	BL00B5899	CD0400B1275	4/3/2000
Alkalinity	Std Method 2320 B	BL00B5899	CD0400B1276	4/3/2000
Alkalinity	Std Method 2320 B	BL00B5899	CD0400B1278	4/3/2000
Alkalinity	Std Method 2320 B	BL00B5899	CD0400B1279	4/3/2000
Alkalinity	Std Method 2320 B	BL00B5899	CD0400B1284	4/4/2000
Alkalinity	Std Method 2320 B	BL00B5899	CD0400B1285	4/4/2000
Alkalinity	Std Method 2320 B	BL00B5899	CD0400B1286	4/4/2000
Alkalinity	Std Method 2320 B	BL00B5899	CD0400B1287	4/4/2000
Alkalinity	Std Method 2320 B	BL00B5899	CD0400B1288	4/4/2000
Alkalinity	Std Method 2320 B	BL00B5899	CD0400B1275	4/3/2000
Alkalinity	Std Method 2320 B	BL00B5904	CD0400B1289	4/5/2000
Alkalinity	Std Method 2320 B	BL00B5904	CD0400B1290	4/5/2000
Alkalinity	Std Method 2320 B	BL00B5904	CD0400B1291	4/5/2000
Alkalinity	Std Method 2320 B	BL00B5904	CD0400B1292	4/5/2000
Alkalinity	Std Method 2320 B	BL00B5904	CD0400B1293	4/5/2000
Alkalinity	Std Method 2320 B	BL00B5904	CD0400B1289	4/5/2000
TDS	Std Method 2540 C	BL00B5900	CD0400B1275	4/3/2000
TDS	Std Method 2540 C	BL00B5900	CD0400B1276	4/3/2000
TDS	Std Method 2540 C	BL00B5900	CD0400B1278	4/3/2000
TDS	Std Method 2540 C	BL00B5900	CD0400B1279	4/3/2000
TDS	Std Method 2540 C	BL00B5900	CD0400B1284	4/4/2000
TDS	Std Method 2540 C	BL00B5900	CD0400B1285	4/4/2000
TDS	Std Method 2540 C	BL00B5900	CD0400B1286	4/4/2000
TDS	Std Method 2540 C	BL00B5900	CD0400B1287	4/4/2000
TDS	Std Method 2540 C	BL00B5900	CD0400B1288	4/4/2000
TDS	Std Method 2540 C	BL00B5900	CD0400B1275	4/3/2000
TDS	Std Method 2540 C	BL00B5905	CD0400B1289	4/5/2000
TDS	Std Method 2540 C	BL00B5905	CD0400B1290	4/5/2000
TDS	Std Method 2540 C	BL00B5905	CD0400B1291	4/5/2000
TDS	Std Method 2540 C	BL00B5905	CD0400B1292	4/5/2000
TDS	Std Method 2540 C	BL00B5905	CD0400B1293	4/5/2000
TDS	Std Method 2540 C	BL00B5905	CD0400B1289	4/5/2000
TDS	Std Method 2540 C	BL00B6022	CD0500B1333	5/1/2000
TDS	Std Method 2540 C	BL00B6022	CD0500B1334	5/1/2000
TDS	Std Method 2540 C	BL00B6022	CD0500B1336	5/1/2000
TDS	Std Method 2540 C	BL00B6022	CD0500B1337	5/1/2000
TDS	Std Method 2540 C	BL00B6022	CD0500B1346	5/2/2000
TDS	Std Method 2540 C	BL00B6022	CD0500B1342	5/2/2000
TDS	Std Method 2540 C	BL00B6022	CD0500B1343	5/2/2000
TDS	Std Method 2540 C	BL00B6022	CD0500B1344	5/2/2000
TDS	Std Method 2540 C	BL00B6022	CD0500B1345	5/2/2000
TDS	Std Method 2540 C	BL00B6022	CD0500B1333	5/1/2000
TDS	Std Method 2540 C	BL00B6292	SLA0600B0117	6/21/2000
TDS	Std Method 2540 C	BL00B6292	DZ0600B5852	6/21/2000
TDS	Std Method 2540 C	BL00B6292	DZ0600B5853	6/21/2000

TDS = Total dissolved solids

Table 9-7 Matrix spike recovery exceedances

Analyte	Method	Batch number	Recovery (%)	Control limits (%)
Alkalinity	Std Method 2320 B	BL00B5848	78	80–120
Alkalinity	Std Method 2320 B	BL00B5848	65	80–120
Alkalinity	Std Method 2320 B	BL00B5961	121	80–120
Alkalinity	Std Method 2320 B	BL00B5961	126	80–120
Alkalinity	Std Method 2320 B	BL98A2656	123	80–120
Alkalinity	Std Method 2320 B	BL98A2656	124	80–120
Alkalinity	Std Method 2320 B	BL98A2793	62	80–120
Alkalinity	Std Method 2320 B	BL98A2793	62	80–120
Alkalinity	Std Method 2320 B	BL99A3722	73	80–120
Alkalinity	Std Method 2320 B	BL99A3735	121	80–120
Alkalinity	Std Method 2320 B	BL99A4736	124	80–120
Alkalinity	Std Method 2320 B	BL99A4736	122	80–120
Alkalinity	Std Method 2320 B	BL99A5002	81	80–120
Ammonia	EPA 350.1	BL98A2161	134	85–118
Ammonia	EPA 350.1	BL98A2161	126	85–118
Boron	EPA 200.7 (D)	BL00B6568	46	80–120
Boron	EPA 200.7 (D)	BL00B6568	44	80–120
Bromide	EPA 300.0 28d Hold	BL00B5279	70	80–120
Bromide	EPA 300.0 28d Hold	BL00B5279	70	80–120
Bromide	EPA 300.0 28d Hold	BL99A3133	74	80–120
Bromide	EPA 300.0 28d Hold	BL99A3133	75	80–120
Bromide	EPA 300.0 28d Hold	BL99A3697	79	80–120
Bromide	EPA 300.0 28d Hold	BL99A3697	64	80–120
Bromide	EPA 300.0 28d Hold	BL99A3839	71	80–120
Bromide	EPA 300.0 28d Hold	BL99A3839	73	80–120
Bromoform	DWR THMFP (Buffered)	BL98A2214	122	80–120
Calcium	EPA 200.7 (D)	BL00B7067	79	80–120
Calcium	EPA 200.7 (D)	BL01B7789	127	80–120
Calcium	EPA 200.7 (D)	BL01B7789	124	80–120
Calcium	EPA 200.7 (D)	BL01B7839	77	80–120
Calcium	EPA 200.7 (D)	BL01B7839	75	80–120
Calcium	EPA 200.7 (D)	BL01B9038	78	80–120
Calcium	EPA 200.7 (D)	BL01B9038	78	80–120
Calcium	EPA 200.7 (D)	BL99A3424	123	80–120
Calcium	EPA 200.7 (D)	BL99A3424	129	80–120
Calcium	EPA 200.7 (D)	BL99A5040	63	80–120
Calcium	EPA 200.7 (D)	BL99A5040	62	80–120
Chloride	EPA 325.2	BL00B6544	116	85–115
Chloride	EPA 325.2	BL00B6544	118	85–115
Chloride	EPA 325.2	BL98A2474	84	85–115
Chloride	EPA 325.2	BL99A3887	82	85–115
Chloride	EPA 325.2	BL99A3887	82	85–115
Chloride	EPA 325.2	BL99A4625	79	85–115
Chloride	EPA 325.2	BL99A4625	80	85–115

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Table 9-7 continued

Analyte	Method	Batch number	Recovery (%)	Control limits (%)
Magnesium	EPA 200.7 (D)	BL01B7789	122	80–120
Magnesium	EPA 200.7 (D)	BL01B7789	123	80–120
Nitrate	Std Method 4500-NO ₃ F	BL00B6136	74	80–120
Nitrate	Std Method 4500-NO ₃ F	BL00B6136	73	80–120
Silver	EPA 200.8 (D)	BL00B6305	74	80–120
Silver	EPA 200.8 (D)	BL00B6305	79	80–120
Silver	EPA 200.8 (D)	BL00B6305	77	80–120
Silver	EPA 200.8 (D)	BL00B6305	79	80–120
Silver	EPA 200.8 (D)	BL00B6305	71	80–120
Silver	EPA 200.8 (D)	BL00B6305	72	80–120
Silver	EPA 200.8 (D)	BL99A4242	79	80–120
Sodium	EPA 200.7 (D)	BL00B5818	120	80–120
Sodium	EPA 200.7 (D)	BL00B6260	156	80–120
Sodium	EPA 200.7 (D)	BL00B6260	160	80–120
Sodium	EPA 200.7 (D)	BL00B6395	125	80–120
Sodium	EPA 200.7 (D)	BL00B6395	142	80–120
Sodium	EPA 200.7 (D)	BL01B7789	120	80–120
Sodium	EPA 200.7 (D)	BL01B8997	120	80–120
Sodium	EPA 200.7 (D)	BL99A3052	74	80–120
Sodium	EPA 200.7 (D)	BL99A3052	10	80–120
Sodium	EPA 200.7 (D)	BL99A3424	68	80–120
Sodium	EPA 200.7 (D)	BL99A3424	63	80–120
Sodium	EPA 200.7 (D)	BL99A3424	37	80–120
Sodium	EPA 200.7 (D)	BL99A3424	67	80–120
Sodium	EPA 200.7 (D)	BL99A4257	177	80–120
Sodium	EPA 200.7 (D)	BL99A4257	194	80–120
Sodium	EPA 200.7 (D)	BL99A5040	67	80–120
Sodium	EPA 200.7 (D)	BL99A5040	59	80–120
Sulfate	EPA 375.2	BL99A3855	74	85–115
Sulfate	EPA 375.2	BL99A3855	75	85–115
Sulfate	EPA 375.2	BL99A3929	117	85–115
Sulfate	EPA 375.2	BL99A3929	116	85–115
Sulfate	EPA 375.2	BL99A4488	117	85–115
TCAA	DWR HAAFP (Reactivity)	BL98A2318	67	70–130
TCAA	DWR HAAFP (Reactivity)	BL98A2318	69	70–130

TCAA = Trichloroacetic acid

Table 9-8 Frequency of QC batches with matrix spike recovery exceedances

Analyte	Total matrix spikes	Matrix spike recoveries out of limits	Frequency of samples out of limits (%)
Alkalinity	603	13	2.2
Ammonia	88	2	2.2
Boron	550	2	0.4
Bromide	631	8	1.2
Bromoform	56	1	1.7
Chloride	780	7	0.9
Calcium	618	11	1.7
Magnesium	618	2	0.3
Nitrate	638	2	0.3
Silver	156	7	4.4
Sodium	562	17	3.0
Sulfate	764	5	0.7
TCAA	16	2	12.5

TCAA = Trichloroacetic acid

Table 9-9 Samples with matrix spike recovery exceedances

Analyte	Method	Batch number	Sample number	Collection date
Alkalinity	Std Method 2320 B	BL00B5848	CD0300B0844	3/20/2000
Alkalinity	Std Method 2320 B	BL00B5848	CD0300B0845	3/20/2000
Alkalinity	Std Method 2320 B	BL00B5848	CD0300B0846	3/20/2000
Alkalinity	Std Method 2320 B	BL00B5961	CD0400B1317	4/17/2000
Alkalinity	Std Method 2320 B	BL00B5961	CD0400B1318	4/17/2000
Alkalinity	Std Method 2320 B	BL00B5961	CD0400B1319	4/17/2000
Alkalinity	Std Method 2320 B	BL00B5961	DA0400B0218	4/19/2000
Alkalinity	Std Method 2320 B	BL00B5961	DA0400B0224	4/19/2000
Alkalinity	Std Method 2320 B	BL00B5961	SLA0400B0086	4/19/2000
Alkalinity	Std Method 2320 B	BL00B5961	CD0400B1325	4/24/2000
Alkalinity	Std Method 2320 B	BL00B5961	CD0400B1326	4/24/2000
Alkalinity	Std Method 2320 B	BL00B5961	CD0400B1327	4/24/2000
Alkalinity	Std Method 2320 B	BL00B5961	CD0400B1318	4/17/2000
Alkalinity	Std Method 2320 B	BL98A2656	CB1098A3702	10/20/1998
Alkalinity	Std Method 2320 B	BL98A2656	CB1098A3703	10/20/1998
Alkalinity	Std Method 2320 B	BL98A2656	CB1098A3704	10/20/1998
Alkalinity	Std Method 2320 B	BL99A3722	CB0599A1847	5/4/1999
Alkalinity	Std Method 2320 B	BL99A3722	CB0599A1848	5/4/1999
Alkalinity	Std Method 2320 B	BL99A3722	CB0599A1850	5/4/1999
Alkalinity	Std Method 2320 B	BL99A3722	CB0599A1851	5/4/1999
Alkalinity	Std Method 2320 B	BL99A3735	CB0599A1856	5/5/1999
Alkalinity	Std Method 2320 B	BL99A3735	CB0599A1857	5/5/1999
Alkalinity	Std Method 2320 B	BL99A3735	CB0599A1858	5/5/1999
Alkalinity	Std Method 2320 B	BL99A3735	CB0599A1859	5/5/1999
Alkalinity	Std Method 2320 B	BL99A3735	CB0599A1860	5/5/1999
Alkalinity	Std Method 2320 B	BL99A3735	CB0599A1861	5/5/1999
Alkalinity	Std Method 2320 B	BL99A3735	CB0599A1862	5/5/1999
Alkalinity	Std Method 2320 B	BL99A3735	CB0599A1863	5/5/1999
Alkalinity	Std Method 2320 B	BL99A3735	CB0599A1864	5/5/1999
Alkalinity	Std Method 2320 B	BL99A3735	CB0599A1865	5/5/1999
Alkalinity	Std Method 2320 B	BL99A4736	CB0999A2606	9/27/1999
Alkalinity	Std Method 2320 B	BL99A4736	CB0999A2607	9/27/1999
Alkalinity	Std Method 2320 B	BL99A4736	CB0999A2608	9/27/1999
Alkalinity	Std Method 2320 B	BL99A4736	CB1099A2826	10/5/1999
Alkalinity	Std Method 2320 B	BL99A4736	CB1099A2827	10/5/1999
Alkalinity	Std Method 2320 B	BL99A4736	CB1099A2828	10/5/1999
Alkalinity	Std Method 2320 B	BL99A4736	CB1099A2829	10/5/1999
Alkalinity	Std Method 2320 B	BL99A4736	CB1099A2830	10/5/1999
Alkalinity	Std Method 2320 B	BL99A4736	CB1099A2812	10/6/1999
Alkalinity	Std Method 2320 B	BL99A4736	CB1099A2813	10/6/1999
Alkalinity	Std Method 2320 B	BL99A4736	CB1099A2815	10/6/1999
Alkalinity	Std Method 2320 B	BL99A4736	CB1099A2816	10/6/1999
Alkalinity	Std Method 2320 B	BL99A5002	SLZ1199A9000	11/17/1999
Alkalinity	Std Method 2320 B	BL99A5002	CB1199A2931	11/22/1999

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Table 9-9 continued

Analyte	Method	Batch number	Sample number	Collection date
Alkalinity	Std Method 2320 B	BL99A5002	CB1199A2932	11/22/1999
Alkalinity	Std Method 2320 B	BL99A5002	CB1199A2933	11/22/1999
Alkalinity	Std Method 2320 B	BL98A2793	CB1198A3873	11/17/1998
Alkalinity	Std Method 2320 B	BL98A2793	CB1198A3874	11/17/1998
Alkalinity	Std Method 2320 B	BL98A2793	CB1198A3875	11/17/1998
Ammonia	EPA 350.1	BL98A2161	CB0898A2524	8/4/1998
Ammonia	EPA 350.1	BL98A2161	CB0898A2525	8/4/1998
Ammonia	EPA 350.1	BL98A2161	CB0898A2526	8/4/1998
Ammonia	EPA 350.1	BL98A2161	CB0898A2527	8/4/1998
Ammonia	EPA 350.1	BL98A2161	CB0898A2658	8/4/1998
Ammonia	EPA 350.1	BL98A2161	CB0898A2659	8/4/1998
Ammonia	EPA 350.1	BL98A2161	CB0898A2660	8/4/1998
Ammonia	EPA 350.1	BL98A2161	CB0898A2661	8/4/1998
Ammonia	EPA 350.1	BL98A2161	CB0898A2662	8/4/1998
Ammonia	EPA 350.1	BL98A2161	CB0898A2533	8/5/1998
Ammonia	EPA 350.1	BL98A2161	CB0898A2534	8/5/1998
Ammonia	EPA 350.1	BL98A2161	CB0898A2535	8/5/1998
Ammonia	EPA 350.1	BL98A2161	CB0898A2536	8/5/1998
Ammonia	EPA 350.1	BL98A2161	CB0898A2537	8/5/1998
Boron	EPA 200.7 (D)	BL00B6568	CD0800B1602	8/7/2000
Boron	EPA 200.7 (D)	BL00B6568	CD0800B1603	8/7/2000
Boron	EPA 200.7 (D)	BL00B6568	CD0800B1604	8/7/2000
Bromide	EPA 300.0 28d Hold	BL00B5279	CB0100B0319	1/10/2000
Bromide	EPA 300.0 28d Hold	BL00B5279	CB0100B0320	1/10/2000
Bromide	EPA 300.0 28d Hold	BL00B5279	CB0100B0321	1/10/2000
Bromide	EPA 300.0 28d Hold	BL99A3133	CB0199A0022	1/11/1999
Bromide	EPA 300.0 28d Hold	BL99A3133	CB0199A0023	1/11/1999
Bromide	EPA 300.0 28d Hold	BL99A3133	CB0199A0024	1/11/1999
Bromide	EPA 300.0 28d Hold	BL99A3133	CB0199A0038	1/19/1999
Bromide	EPA 300.0 28d Hold	BL99A3133	CB0199A0039	1/19/1999
Bromide	EPA 300.0 28d Hold	BL99A3133	CB0199A0040	1/19/1999
Bromide	EPA 300.0 28d Hold	BL99A3133	CB0199A0022	1/11/1999
Bromide	EPA 300.0 28d Hold	BL99A3697	CB0499A1617	4/26/1999
Bromide	EPA 300.0 28d Hold	BL99A3697	CB0499A1618	4/26/1999
Bromide	EPA 300.0 28d Hold	BL99A3697	CB0499A1619	4/26/1999
Bromide	EPA 300.0 28d Hold	BL99A3839	SLA0599A0205	5/19/1999
Bromide	EPA 300.0 28d Hold	BL99A3839	DA0599A0154	5/19/1999
Bromide	EPA 300.0 28d Hold	BL99A3839	DA0599A0146	5/19/1999

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Table 9-9 continued

Analyte	Method	Batch number	Sample number	Collection date
Bromoform	DWR THMFP (Buffered)	BL98A2214	CB0898A2524	8/4/1998
Bromoform	DWR THMFP (Buffered)	BL98A2214	CB0898A2525	8/4/1998
Bromoform	DWR THMFP (Buffered)	BL98A2214	CB0898A2526	8/4/1998
Bromoform	DWR THMFP (Buffered)	BL98A2214	CB0898A2527	8/4/1998
Calcium	EPA 200.7 (D)	BL01B9038	CB0801B0685	8/27/2001
Calcium	EPA 200.7 (D)	BL01B9038	CB0801B0684	8/27/2001
Calcium	EPA 200.7 (D)	BL00B7067	DZ1000B1499	10/18/2000
Calcium	EPA 200.7 (D)	BL00B7067	DZ1000B1501	10/18/2000
Calcium	EPA 200.7 (D)	BL99A3424	CB0399A1238	3/15/1999
Calcium	EPA 200.7 (D)	BL99A3424	CB0399A1239	3/15/1999
Calcium	EPA 200.7 (D)	BL99A5040	CB1199A2931	11/22/1999
Calcium	EPA 200.7 (D)	BL99A5040	CB1199A2932	11/22/1999
Calcium	EPA 200.7 (D)	BL99A5040	CB1199A2933	11/22/1999
Calcium	EPA 200.7 (D)	BL01B7789	CB0201B1776	2/26/2001
Calcium	EPA 200.7 (D)	BL01B7789	CB0201B1777	2/26/2001
Calcium	EPA 200.7 (D)	BL01B7839	CB0301B0173	3/6/2001
Calcium	EPA 200.7 (D)	BL01B7839	CB0301B0171	3/6/2001
Calcium	EPA 200.7 (D)	BL01B7839	CB0301B0174	3/6/2001
Calcium	EPA 200.7 (D)	BL01B7839	CB0301B0169	3/6/2001
Calcium	EPA 200.7 (D)	BL01B7839	CB0301B0170	3/6/2001
Calcium	EPA 200.7 (D)	BL01B7839	CB0301B0172	3/6/2001
Calcium	EPA 200.7 (D)	BL01B7839	CB0301B0175	3/6/2001
Calcium	EPA 200.7 (D)	BL01B7839	CB0301B0177	3/6/2001
Calcium	EPA 200.7 (D)	BL01B7839	CB0301B0178	3/6/2001
Calcium	EPA 200.7 (D)	BL01B7839	CB0301B0169	3/6/2001
Calcium	EPA 200.7 (D)	BL01B7839	CB0301B0169	3/6/2001
Calcium	EPA 200.7 (D)	BL01B7839	CB0301B0171	3/6/2001
Chloride	EPA 325.2	BL00B6544	CD0800B1550	8/1/2000
Chloride	EPA 325.2	BL00B6544	CD0800B1551	8/1/2000
Chloride	EPA 325.2	BL00B6544	CD0800B1552	8/1/2000
Chloride	EPA 325.2	BL00B6544	CD0800B1553	8/1/2000
Chloride	EPA 325.2	BL00B6544	CD0800B1554	8/1/2000
Chloride	EPA 325.2	BL00B6544	CD0800B1584	8/1/2000
Chloride	EPA 325.2	BL00B6544	CD0800B1586	8/1/2000
Chloride	EPA 325.2	BL00B6544	CD0800B1583	8/1/2000
Chloride	EPA 325.2	BL00B6544	CD0800B1639	8/2/2000
Chloride	EPA 325.2	BL00B6544	CD0800B1642	8/2/2000
Chloride	EPA 325.2	BL00B6544	CD0800B1643	8/2/2000

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Table 9-9 continued

Analyte	Method	Batch number	Sample number	Collection date
Chloride	EPA 325.2	BL00B6544	CD0800B1585	8/2/2000
Chloride	EPA 325.2	BL00B6544	CD0800B1582	8/2/2000
Chloride	EPA 325.2	BL00B6544	CD0800B1602	8/7/2000
Chloride	EPA 325.2	BL00B6544	CD0800B1603	8/7/2000
Chloride	EPA 325.2	BL00B6544	CD0800B1604	8/7/2000
Chloride	EPA 325.2	BL98A2474	CA0998A0306	9/29/1998
Chloride	EPA 325.2	BL98A2474	CA0998A0307	9/29/1998
Chloride	EPA 325.2	BL98A2474	CA0998A0308	9/29/1998
Chloride	EPA 325.2	BL99A3887	SLA0599A0205	5/19/1999
Chloride	EPA 325.2	BL99A3887	DA0599A0154	5/19/1999
Chloride	EPA 325.2	BL99A3887	DA0599A0146	5/19/1999
Chloride	EPA 325.2	BL99A4625	CB0999A2596	9/20/1999
Chloride	EPA 325.2	BL99A4625	CB0999A2597	9/20/1999
Chloride	EPA 325.2	BL99A4625	CB0999A2598	9/20/1999
Magnesium	EPA 200.7 (D)	BL01B7789	CB0201B1776	2/26/2001
Magnesium	EPA 200.7 (D)	BL01B7789	CB0201B1777	2/26/2001
Nitrate	Std Method 4500-NO ₃ F	BL00B6136	SLA0500B0101	5/17/2000
Nitrate	Std Method 4500-NO ₃ F	BL00B6136	DA0500B0255	5/17/2000
Nitrate	Std Method 4500-NO ₃ F	BL00B6136	DA0500B0249	5/17/2000
Silver	EPA 200.8 (D)	BL00B6305	DZ0600B5852	6/21/2000
Silver	EPA 200.8 (D)	BL99A4242	SLA0799A0394	7/21/1999
Silver	EPA 200.8 (D)	BL99A4242	DA0799A0208	7/21/1999
Silver	EPA 200.8 (D)	BL00B6305	SLA0600B0117	6/21/2000
Sodium	EPA 200.7 (D)	BL00B6395	CD0700B1462	7/3/2000
Sodium	EPA 200.7 (D)	BL99A3052	CB0199A0020	1/6/1999
Sodium	EPA 200.7 (D)	BL00B6395	CD0700B1474	7/3/2000
Sodium	EPA 200.7 (D)	BL01B8997	CB0801B0669	8/20/2001
Sodium	EPA 200.7 (D)	BL01B7789	CB0201B1776	2/26/2001
Sodium	EPA 200.7 (D)	BL00B6395	CD0700B1481	7/10/2000
Sodium	EPA 200.7 (D)	BL00B6395	CD0700B1518	7/5/2000
Sodium	EPA 200.7 (D)	BL00B6568	CD0800B1603	8/7/2000
Sodium	EPA 200.7 (D)	BL00B6568	CD0800B1602	8/7/2000
Sodium	EPA 200.7 (D)	BL00B6395	CD0700B1475	7/3/2000
Sodium	EPA 200.7 (D)	BL00B6395	CD0700B1519	7/5/2000
Sodium	EPA 200.7 (D)	BL00B6395	CD0700B1522	7/5/2000
Sodium	EPA 200.7 (D)	BL00B6395	CD0700B1471	7/3/2000
Sodium	EPA 200.7 (D)	BL00B6260	CD0600B1432	6/12/2000
Sodium	EPA 200.7 (D)	BL00B6395	CD0700B1521	7/5/2000
Sodium	EPA 200.7 (D)	BL00B6568	CD0800B1604	8/7/2000
Sodium	EPA 200.7 (D)	BL00B6260	CD0600B1431	6/12/2000

Table continued on next page

Table 9-9 continued

Analyte	Method	Batch number	Sample number	Collection date
Sodium	EPA 200.7 (D)	BL01B8997	CB0801B0671	8/20/2001
Sodium	EPA 200.7 (D)	BL99A5040	CB1199A2933	11/22/1999
Sodium	EPA 200.7 (D)	BL00B5818	CD0300B0798	3/13/2000
Sodium	EPA 200.7 (D)	BL00B5818	CD0300B0797	3/13/2000
Sodium	EPA 200.7 (D)	BL00B5818	CD0300B0799	3/13/2000
Sodium	EPA 200.7 (D)	BL99A5040	CB1199A2932	11/22/1999
Sodium	EPA 200.7 (D)	BL00B6260	CD0600B1430	6/12/2000
Sodium	EPA 200.7 (D)	BL99A3052	CB0199A0013	1/5/1999
Sodium	EPA 200.7 (D)	BL99A5040	CB1199A2931	11/22/1999
Sodium	EPA 200.7 (D)	BL00B6395	CD0700B1463	7/3/2000
Sodium	EPA 200.7 (D)	BL00B6395	CD0700B1483	7/10/2000
Sodium	EPA 200.7 (D)	BL99A3424	CB0399A1239	3/15/1999
Sodium	EPA 200.7 (D)	BL00B6395	CD0700B1482	7/10/2000
Sulfate	EPA 375.2	BL00B7236	DZ1100B2357	11/15/2000
Sulfate	EPA 375.2	BL00B7236	DZ1100B2357	11/15/2000
Sulfate	EPA 375.2	BL00B7236	DZ1100B2358	11/15/2000
Sulfate	EPA 375.2	BL00B7236	SLA1100B0374	11/15/2000
Sulfate	EPA 375.2	BL00B7236	DZ1100B2357	11/15/2000
Sulfate	EPA 375.2	BL00B7236	SLA1100B0374	11/15/2000
Sulfate	EPA 375.2	BL99A3855	CB0599A1856	5/5/1999
Sulfate	EPA 375.2	BL99A3855	CB0599A1857	5/5/1999
Sulfate	EPA 375.2	BL99A3855	CB0599A1858	5/5/1999
Sulfate	EPA 375.2	BL99A3855	CB0599A1859	5/5/1999
Sulfate	EPA 375.2	BL99A3855	CB0599A1860	5/5/1999
Sulfate	EPA 375.2	BL99A3855	CB0599A1861	5/5/1999
Sulfate	EPA 375.2	BL99A3855	CB0599A1862	5/5/1999
Sulfate	EPA 375.2	BL99A3855	CB0599A1863	5/5/1999
Sulfate	EPA 375.2	BL99A3855	CB0599A1864	5/5/1999
Sulfate	EPA 375.2	BL99A3855	CB0599A1865	5/5/1999
Sulfate	EPA 375.2	BL99A3855	CB0599A1883	5/10/1999
Sulfate	EPA 375.2	BL99A3855	CB0599A1884	5/10/1999
Sulfate	EPA 375.2	BL99A3855	CB0599A1885	5/10/1999
Sulfate	EPA 375.2	BL99A3929	CB0699A2043	6/1/1999
Sulfate	EPA 375.2	BL99A3929	CB0699A2044	6/1/1999
Sulfate	EPA 375.2	BL99A3929	CB0699A2045	6/1/1999
Sulfate	EPA 375.2	BL99A3929	CB0699A2046	6/1/1999
Sulfate	EPA 375.2	BL99A3929	CB0699A2047	6/1/1999
Sulfate	EPA 375.2	BL99A3929	CB0699A2025	6/1/1999
Sulfate	EPA 375.2	BL99A3929	CB0699A2026	6/1/1999
Sulfate	EPA 375.2	BL99A3929	CB0699A2028	6/1/1999
Sulfate	EPA 375.2	BL99A3929	CB0699A2029	6/1/1999
Sulfate	EPA 375.2	BL99A3929	CB0699A2050	6/2/1999
Sulfate	EPA 375.2	BL99A3929	CB0699A2051	6/2/1999
Sulfate	EPA 375.2	BL99A3929	CB0699A2052	6/2/1999

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Table 9-9 continued

Analyte	Method	Batch number	Sample number	Collection date
Sulfate	EPA 375.2	BL99A3929	CB0699A2053	6/2/1999
Sulfate	EPA 375.2	BL99A3929	CB0699A2054	6/2/1999
Sulfate	EPA 375.2	BL99A3929	CB0699A2065	6/7/1999
Sulfate	EPA 375.2	BL99A3929	CB0699A2066	6/7/1999
Sulfate	EPA 375.2	BL99A3929	CB0699A2067	6/7/1999
Sulfate	EPA 375.2	BL99A4488	CB0899A2488	8/31/1999
Sulfate	EPA 375.2	BL99A4488	CB0899A2489	8/31/1999
Sulfate	EPA 375.2	BL99A4488	CB0899A2490	8/31/1999
TCAA	DWR HAAFP (Reactivity)	BL98A2318	CB0898A2524	8/4/1998
TCAA	DWR HAAFP (Reactivity)	BL98A2318	CB0898A2525	8/4/1998
TCAA	DWR HAAFP (Reactivity)	BL98A2318	CB0898A2526	8/4/1998
TCAA	DWR HAAFP (Reactivity)	BL98A2318	CB0898A2527	8/4/1998
TCAA	DWR HAAFP (Reactivity)	BL98A2318	CB0898A2658	8/4/1998
TCAA	DWR HAAFP (Reactivity)	BL98A2318	CB0898A2533	8/5/1998
TCAA	DWR HAAFP (Reactivity)	BL98A2318	CB0898A2534	8/5/1998
TCAA	DWR HAAFP (Reactivity)	BL98A2318	CB0898A2535	8/5/1998
TCAA	DWR HAAFP (Reactivity)	BL98A2318	CB0898A2536	8/5/1998
TCAA	DWR HAAFP (Reactivity)	BL98A2318	CB0898A2537	8/5/1998

TCAA = Trichloroacetic acid

Table 9-10 Matrix spike duplicate exceedances

Analyte	Method	Batch number	Result	Control limits
Bromide	EPA 300.0 28d Hold	BL99A3697	21.0	0–20
Sodium	EPA 200.7 (D)	BL01B7832	23.6	0–20
Sodium	EPA 200.7 (D)	BL99A3424	58.6	0–20

Table 9-11 Number of matrix spike duplicate recoveries out of limits

Analyte	Total matrix spike duplicates	Matrix spike duplicate recoveries out of limits	Frequency of samples out of limits (%)
Bromide	280	1	0.4
Sodium	276	2	0.7

Table 9-12 Samples with matrix spike duplicate exceedances

Analyte	Method	Batch number	Sample number	Collection date
Bromide	EPA 300.0	BL99A3697	CB0499A1617	4/26/1999
Bromide	EPA 300.0	BL99A3697	CB0499A1618	4/26/1999
Bromide	EPA 300.0	BL99A3697	CB0499A1619	4/26/1999
Sodium	EPA 200.7 (D)	BL01B7832	CB0301B0162	3/5/2001
Sodium	EPA 200.7 (D)	BL99A3424	CB0399A1239	3/15/1999
Sodium	EPA 200.7 (D)	BL01B7832	CB0301B0163	3/5/2001
Sodium	EPA 200.7 (D)	BL01B7832	CB0301B0160	3/5/2001
Sodium	EPA 200.7 (D)	BL01B7832	CB0301B0161	3/5/2001
Sodium	EPA 200.7 (D)	BL01B7832	CB0301B0164	3/5/2001
Sodium	EPA 200.7 (D)	BL99A3424	CB0399A1238	3/15/1999

Table 9-13 Sample duplicate exceedances

Analyte	Method	Batch number	Result %	Limit %
TOC	EPA 415.1 (T) Ox	BL00B6701	161	0-30
TOC	EPA 415.1 (T) Ox	BL00B6193	36	0-30
TOC	EPA 415.1 (T) Cmbst	BL01B7534	35	0-30
DOC	EPA 415.1 (D) Ox	BL99A4748	32	0-30
DOC	EPA 415.1 (D) Ox	BL99A3922	50	0-30
DOC	EPA 415.1 (D) Ox	BL98A2776	41	0-30
DOC	EPA 415.1 (D) Ox	BL01B7462	180	0-30
DOC	EPA 415.1 (D) Ox	BL00B6787	75	0-30
TDS	Std Method 2540 C	BL00B6022	15	0-15
Turbidity	EPA 180.1	BL00B6513	16	0-15

TOC = Total organic carbon

DOC = Dissolved organic carbon

TDS = Total dissolved solids

Table 9-14 Number of sample duplicate exceedances

Analyte	Method	Total sample duplicates	Sample duplicates out of limits	Frequency of samples out of limits (%)
DOC	EPA 415.1 (D) Ox	498	5	1
Solids	Std Method 2540 C	299	1	0.33
TOC	EPA 415.1 (T) Ox	383	2	0.5
TOC	EPA 415.1 (T) Cmbst	92	1	1
Turbidity	EPA 180.1	311	1	0.32

DOC = Dissolved organic carbon

TOC = Total organic carbon

Table 9-15 Samples with sample duplicate exceedances

Analyte	Method	Batch number	Sample number	Collection date
TOC	EPA 415.1 (T) Ox	BL00B6701	CD0800B1618	8/21/2000
TOC	EPA 415.1 (T) Ox	BL00B6701	CD0800B1619	8/21/2000
TOC	EPA 415.1 (T) Ox	BL00B6701	CD0800B1620	8/21/2000
TOC	EPA 415.1 (T) Ox	BL00B6701	CD0800B1620	8/21/2000
TOC	EPA 415.1 (T) Ox	BL00B6193	CD0500B1391	5/30/2000
TOC	EPA 415.1 (T) Ox	BL00B6193	CD0500B1392	5/30/2000
TOC	EPA 415.1 (T) Ox	BL00B6193	CD0500B1393	5/30/2000
TOC	EPA 415.1 (T) Ox	BL00B6193	CD0500B1393	5/30/2000
TOC	EPA 415.1 (T) Cmbst	BL01B7534	CB1200B0075	12/26/2000
TOC	EPA 415.1 (T) Cmbst	BL01B7534	CB1200B0102	12/18/2000
TOC	EPA 415.1 (T) Cmbst	BL01B7534	DZ0101B4838	1/10/2001
TOC	EPA 415.1 (T) Cmbst	BL01B7534	DZ0101B4839	1/10/2001
TOC	EPA 415.1 (T) Cmbst	BL01B7534	DZ0101B4840	1/10/2001
TOC	EPA 415.1 (T) Cmbst	BL01B7534	CB1200B0073	12/26/2000
TOC	EPA 415.1 (T) Cmbst	BL01B7534	CB1200B0074	12/26/2000
DOC	EPA 415.1 (D) Ox	BL99A4748	CB1099A2822	10/7/1999
DOC	EPA 415.1 (D) Ox	BL99A4748	CB1099A2823	10/7/1999
DOC	EPA 415.1 (D) Ox	BL99A4748	CB1099A2824	10/7/1999
DOC	EPA 415.1 (D) Ox	BL99A4748	CB1099A2825	10/7/1999
DOC	EPA 415.1 (D) Ox	BL99A4748	CB1099A2804	10/12/1999
DOC	EPA 415.1 (D) Ox	BL99A4748	CB1099A2805	10/12/1999
DOC	EPA 415.1 (D) Ox	BL99A4748	CB1099A2803	10/12/1999
DOC	EPA 415.1 (D) Ox	BL99A4748	CB1099A2804	10/12/1999
DOC	EPA 415.1 (D) Ox	BL99A4748	CB1099A2825	10/7/1999
DOC	EPA 415.1 (D) Ox	BL99A3922	CB0699A2050	6/2/1999
DOC	EPA 415.1 (D) Ox	BL99A3922	CB0699A2051	6/2/1999
DOC	EPA 415.1 (D) Ox	BL99A3922	CB0699A2052	6/2/1999
DOC	EPA 415.1 (D) Ox	BL99A3922	CB0699A2053	6/2/1999
DOC	EPA 415.1 (D) Ox	BL99A3922	CB0699A2054	6/2/1999
DOC	EPA 415.1 (D) Ox	BL99A3922	CB0699A2051	6/2/1999
DOC	EPA 415.1 (D) Ox	BL98A2776	CB1198A3873	11/17/1998
DOC	EPA 415.1 (D) Ox	BL98A2776	CB1198A3874	11/17/1998
DOC	EPA 415.1 (D) Ox	BL98A2776	CB1198A3875	11/17/1998
DOC	EPA 415.1 (D) Ox	BL98A2776	CB1198A3874	11/17/1998
DOC	EPA 415.1 (D) Ox	BL01B7462	CB1200B0073	12/26/2000
DOC	EPA 415.1 (D) Ox	BL01B7462	CB1200B0074	12/26/2000
DOC	EPA 415.1 (D) Ox	BL01B7462	CB1200B0075	12/26/2000
DOC	EPA 415.1 (D) Ox	BL01B7462	CB1200B0074	12/26/2000
DOC	EPA 415.1 (D) Ox	BL00B6787	CD0900B1652	9/5/2000

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Table 9-15 continued

Analyte	Method	Batch number	Sample number	Collection date
DOC	EPA 415.1 (D) Ox	BL00B6787	CD0900B1653	9/5/2000
DOC	EPA 415.1 (D) Ox	BL00B6787	CD0900B1654	9/5/2000
DOC	EPA 415.1 (D) Ox	BL00B6787	CD0900B1655	9/5/2000
DOC	EPA 415.1 (D) Ox	BL00B6787	CD0900B1656	9/5/2000
DOC	EPA 415.1 (D) Ox	BL00B6787	CD0900B1661	9/6/2000
DOC	EPA 415.1 (D) Ox	BL00B6787	CD0900B1662	9/6/2000
DOC	EPA 415.1 (D) Ox	BL00B6787	CD0900B1663	9/6/2000
DOC	EPA 415.1 (D) Ox	BL00B6787	CD0900B1665	9/6/2000
DOC	EPA 415.1 (D) Ox	BL00B6787	CD0900B1653	9/5/2000
DOC	EPA 415.1 (D) Ox	BL00B6787	CD0900B1665	9/6/2000
TDS	Std Method 2540 C	BL00B6022	CD0500B1333	5/1/2000
TDS	Std Method 2540 C	BL00B6022	CD0500B1334	5/1/2000
TDS	Std Method 2540 C	BL00B6022	CD0500B1336	5/1/2000
TDS	Std Method 2540 C	BL00B6022	CD0500B1337	5/1/2000
TDS	Std Method 2540 C	BL00B6022	CD0500B1346	5/2/2000
TDS	Std Method 2540 C	BL00B6022	CD0500B1342	5/2/2000
TDS	Std Method 2540 C	BL00B6022	CD0500B1343	5/2/2000
TDS	Std Method 2540 C	BL00B6022	CD0500B1344	5/2/2000
TDS	Std Method 2540 C	BL00B6022	CD0500B1345	5/2/2000
TDS	Std Method 2540 C	BL00B6022	CD0500B1333	5/1/2000
Turbidity	EPA 180.1	BL00B6513	CD0800B1639	8/2/2000
Turbidity	EPA 180.1	BL00B6513	CD0800B1642	8/2/2000
Turbidity	EPA 180.1	BL00B6513	CD0800B1643	8/2/2000
Turbidity	EPA 180.1	BL00B6513	CD0800B1585	8/2/2000
Turbidity	EPA 180.1	BL00B6513	CD0800B1582	8/2/2000
			CD0800B1585	8/2/2000

TOC = Total organic carbon
 DOC = Dissolved organic carbon
 TDS = Total dissolved solids

